

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A method, comprising:

assigning a plurality of upper-level addresses based on an upper-level protocol to a first Fibre Channel (FC) node device in a communications system, the first FC node device supporting the FC protocol at a base layer, wherein assigning the plurality of upper-level addresses comprises encoding ~~an~~ the plurality of upper-level ~~address~~ addresses within a symbolic name of the first FC node device, wherein the plurality of upper-level addresses includes a primary address and a backup address, wherein the backup address is associated with a second FC node device; and

in response to detecting a link failure of the second FC node device, configuring each FC node device in the communications system to resolve ~~an upper-level~~ the backup address into an address of the first FC node device based on the FC protocol.

2. (Previously Presented) The method of claim 1, wherein the upper-level protocol is a network protocol.
3. (Original) The method of claim 2, wherein the network protocol is the Transmission Control Protocol over the Internet Protocol (TCP/IP), and the upper-level addresses are IP addresses.
4. (Currently amended) The method of claim 1, wherein encoding the ~~multiple plurality of~~ upper-level addresses within the symbolic name of the first FC node device is based on a predefined encoding scheme.

5. (Original) The method of claim 4, wherein the predefined encoding scheme includes using selected bytes the symbolic name field defined in the FC protocol to store the plurality of upper-level addresses.

6. (Original) The method of claim 1, wherein configuring each FC node device comprises configuring the FC node device to send a RFT_ID message to a name server for a FC fabric that enables communications between the FC node devices, and to send a RSPN_ID message to the name server.

7. (Original) The method of claim 6, wherein configuring each FC node device comprises, configuring the FC node device to send a GID_FT message to the name server, to send a GSPN_ID message to the name server for each port identified in a response to the GID_FT message, to compare the upper-level address with the addresses encoded in a symbolic name received in response to the GSPN_ID message, and to map the upper-level address to a port ID of the FC node device that has the upper-level address encoded in its symbolic name.

8-20. (Canceled)

21. (Currently amended) A storage device, comprising:

a processor;

a memory coupled to the processor, the memory storing instructions which when executed by the processor cause the storage device to perform a method comprising:

receiving input of a plurality of IP addresses to be associated with a first Fibre Channel (FC) N_Port of the storage device; and

storing the plurality of IP addresses as a symbolic name within a symbolic name field for the first FC N_Port, wherein the plurality of IP addresses includes a primary IP address and a backup IP address associated with a second FC N_Port.

22. (Currently amended) The storage device of claim 21, wherein the method further comprises performing a registration procedure to register the symbolic name, and each communications protocol supported by the first FC N_Port with a name server for the FC fabric to which the first FC N_Port is connected.

23. (Currently amended) The storage device of claim 22, wherein ~~the multiple IP addresses comprise a primary IP address and a backup IP address, and~~ the registration procedure comprises a first registration operation to register the primary IP address, and a second registration operation to register the backup IP address.

24. (Original) The storage device of claim 23, wherein the first registration operation and the second registration operation are the same registration operation.

25. (Original) The storage device of claim 23, wherein the method further comprises detecting a failure of a primary link between a pair of remote N_Ports, wherein one of the remote N_Ports has the backup IP address as a primary IP address.

26. (Original) The storage device of claim 25, wherein the second registration operation is performed after detecting the failure.

27. (Currently amended) A computer readable storage medium, having stored thereon on a sequence of instructions which when executed by a processor for a storage device, causes the storage device to perform a method comprising:

receiving input of a plurality of IP addresses to be associated with a first Fibre Channel (FC) N_Port of the storage device; and

storing the plurality of IP addresses as a symbolic name within a symbolic name field for the first FC N_Port, wherein the plurality of IP addresses includes a primary IP address and a backup IP address, wherein the backup IP address is associated with a second FC N_Port.

28. (Currently amended) The computer readable storage medium of claim 27, wherein the method further comprises performing a registration procedure in which the ~~multiple plurality~~ of IP addresses and communications protocols supported by the first FC N_Port is registered with a name server for a FC fabric to which the first FC N_Port is connected.

29. (Currently amended) The computer readable storage medium of claim 28, wherein ~~the multiple IP addresses comprise a primary IP address and a backup IP address, and~~ the registration procedure comprises a first registration operation to registration the primary IP address and a second registration operation to register the backup IP address.

30. (Previously Presented) The computer readable storage medium of claim 29, wherein the first registration operation and the second registration operation are the same operation.

31. (Previously Presented) The computer readable storage medium of claim 29, wherein the method further comprises detecting a failure of primary link between a pair of remote N_Ports, wherein one of the remote N_Ports has the backup IP address as a primary IP address.

32. (Previously Presented) The computer readable storage medium of claim 31, wherein the second registration operation is performed after detecting the failure.